ESTIMATION OF CROP EVAPOTRANSPIRATION USING LYSIMETER

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KELULUSAN PERMOHONAN DANA KECEMERLANGAN 01/2011

Tajuk Projek	:	Estimation of Crop Evapotranspiration Using Lysimeter
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Dengan hormatnya perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan pihak Universiti telah meluluskan cadangan penyelidikan Y. Brs Prof./tuan/puan untuk membiayai projek penyelidikan di bawah Dana Kecemerlangan UiTM.

3. Bagi pihak Universiti kami mengucapkan tahniah kepada Y. Brs. Prof./tuan/puan kerana kejayaan ini dan seterusnya diharapkan berjaya menyiapkan projek ini dengan cemerlang.

4. Peruntukan kewangan akan disalurkan melalui tiga (3) peringkat berdasarkan kepada laporan kemajuan serta kewangan yang mencapai perbelanjaan lebih kurang 50% dari peruntukan yang diterima.

Peringkat Pertama	20%
Peringkat Kedua	40%
Peringkat Ketiga	40%

5. Untuk tujuan mengemaskini, pihak Y. Brs. Prof./tuan/puan adalah diminta untuk melengkapkan semula kertas cadangan penyelidikan sekiranya perlu, mengisi borang setuju terima projek penyelidikan dan menyusun perancangan semula bajet yang baru seperti yang diluluskan. Sila lihat lampiran bagi tatacara tambahan untuk pengurusan projek.

Sekian, harap maklum.

"SELAMAT MENJALANKAN PENYELIDIKAN DENGAN JAYANYA"

Yang benar

MUSTAFAR KAMAL HAMZAH
Ketua Penyelidikan (Sains dan Teknologi)

/RS..

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EXECUTIVE SUMMARY

The determination of crop evapotranspiration is important in determining irrigation water requirements in order to have better irrigation management and scheduling. A research was carried out to estimate water requirement (evapotranspiration) for Kacip Fatimah and *Stevia Rebaudiana* using lysimeter. Three water tables of 15 cm, 25 cm and 30 cm were evaluated. The water table was constant throughout the research and their losses were measured and replaced. The measured water loss is known as the estimated crop water requirement or evapotranspiration (ET). From the result, the water table was significantly affecting the water requirement and growth performance of both crops. For Kacip Fatimah, the average value of ET for water table at 15 cm, 25 cm and 30 cm were at 1.70 mm/day, 1.18 mm/day and 0.48 mm/day respectively. While for *Stevia Rebaudiana*, the average values of ET were at 1.78 mm/day, 1.58 mm/day and 1.15mm/day respectively. From the analyses of variance, there was a significant difference between plant growth in different water tables as plant height and the length of root were increased as the depth of water table increased. On the other hand, number of leaves were decreased as the depth of water table increased.

Keyword: Lysimeter, water requirement, evapotranspiration.

1.0 INTRODUCTION

Many growers tend to apply the same amount of water and fail to measure and optimize the water supply according to variable requirements of crops. Excessive irrigation wastes water and will affect plant growth due to water-logging and salinisation.

Irrigation need is dependent on a few factors. As shown by the equation (1) below, the quantity of water that should be applied is based on i) evapotranspiration (crop water requirement ii) seepage iii) deep percolation and iv) runoff. The three latter factors are dependent on the characteristic of soil.

Irrigation need = Evapotranspiration (ET) + seepage + deep percolation + runoff (1)

For reliable estimates of irrigation need, information on accurate predictions of ET is necessary for an efficient use of irrigation water. ET is also known as crop water requirement or need. It is a combination of evaporation and transpiration process where it is the total quantity of water evaporated from the soil or from droplets of the plants, as well as from the plant stomata. Most the the water consumed by plant is used for these two processes and it is strongly dependent on crop types, crop growth stage and climatic conditions.

Therefore, the aims of this study were i) to determine the crop ET by using lysimeter for specific crops; Kacip Fatimah and Stevia ii) to observe the effect of water table depths towards crop growth performance and ET rate. The data of microclimate and growth performance of the crops were also collected. The results provided useful data in finding crop coefficient (Kc) in order to increase the efficiency of irrigation management for a specific crop i.e Kacip Fatimah and Stevia.